Suter Consulting

Communication écrite multilingue • Multilingual written communication
Comunicazione scritta plurilingue • Mehrsprachige schriftliche Kommunikation

CEN/TC312's Liaison to CEN/TC164

Update

as of October 11th, 2019

Dr. Jean-Marc Suter

physicist SIA, Suter Consulting, Berne

suter@suterconsulting.com

Content

- General about CEN/TC 164
- Status of the revision of EN 806 and SIA 385/1
- Strategic Working Group: the next steps

- Background information from the March SKN meeting
  - Facts and figures on drinking water hygiene in buildings
  - Specific rules for hygiene in hot water systems including a preheating zone

General about CEN/TC164 [1]

- CEN/TC164 *"Water supply"* (cold and hot water systems in buildings, from the entry into the premises)
- CEN/TC164/WG2 "*Internal systems and components"*
  Latest meeting: October 9th, 2019 in Berlin, Germany
  Next meeting: October 15th, 2020 in Delft, The Netherlands
- CEN/TC164/WG2/AHG "*Ad-Hoc-Group*"
  The steering group of WG2
  Most recent meetings: April 10th (web) / June 14th (web) / July 9-10th in Gattico, Italy / August 27th (web) / October 8th, 2019 in Berlin
  Next meetings: November 4th, 2019 (web) / January 22-23rd 2020 in Cologne, Germany / May 26-27th in Marne-la-Vallée, France / October 14th in Delft. Several web meetings will be arranged on short term between these dates. I am a full member of AHG.

General about CEN/TC164 [2]

- Revision of the EU Drinking Water Directive (DWD), mainly of the article 10a:
  - After more than 15 years of standstill, things are finally moving forward in the direction wanted by the industry. The EU Commission wanted requirements on PRODUCTS in contact with water for human consumption. Industry disagreed fundamentally.
  - Now, EU Commission, EU Parliament and EU Council of Ministers agree that the requirements will be on MATERIALS in contact with water for human consumption. The objective is unified requirements all over Europe. Harmonization is essential for the unique market.
  - This important step was achieved thanks to an intensive dialog with the Commission for several years, especially by Mr. Volker Meyer, Chairman of the association “European Drinking Water (EDW)”, Convenor of CEN/TC164/WG2 and of its Ad-Hoc Group.

General about CEN/TC164 [3]

- Revision of the EU Drinking Water Directive (DWD), mainly of the article 10a:
  - So-called positive lists of allowed materials will be established and periodically updated.
  - Two organizations are willing to cooperate in the management and implementation of the positive lists and the necessary material tests:
    - ECHA, 636 employees, founded 2007 in Helsinki, handling at the moment more than 140’000 substances
    - Joint Research Centre (JRC), 3000 employees in 6 different Member States
  - Summarizing: The basic decision has been made, but several years are still needed until the details are clarified and the whole new regulation can be enforced. Meanwhile, CEN/TC164/WG2 is moving forward in revising EN 806.

Revision of EN 806 and SIA 385/1

- **EN 806** "Technical Rules Drinking Water Installations" (4 parts)
- First standard considered for revision: EN 806-2 -- Design of drinking water installations in buildings
- Status: about 60% of the text has been discussed in a first round. Emphasis is put on the drinking water distribution system (cold and hot) and on materials.
  So far, no solar thermal specific feature has been included.

- **SIA 385/1** "Hot water systems in buildings – General and requirements" (Swiss standard dealing with hygiene, users' comfort and energy efficiency; 1st edition: 2011; since 2016 in revision)
- Status: second public enquiry resulted in about 300 comments!
- Swissolar agrees with the stated hygiene requirements for solar thermal systems. However, several representatives of municipal utilities or non-solar technologies as well as some scientists have still to be convinced of the correctness of the requirements. And further research in microbiology is needed.

Strategic Working Group: the next steps

- Discuss the proposal from prSIA 385/1 within the Strategic Working Group.
- Compare this proposal with other rules applied in the different countries and with our “Code of Practice” of 2013.
- Discuss on how to enter the position of the solar thermal community to CEN/TC164/WG2, for consideration in the revised EN 806.

Background:

The next 8 slides with technical and scientific details were already presented at the March 2019 SKN meeting.

Thank you for your attention!

Facts and figures on drinking water hygiene in buildings

- Much more legionellosis cases in the summer months than in the winter time
- Much more contaminations by humid cooling towers than by drinking water systems
- Several measuring campaigns on drinking water installations performed in multi-family houses, in particular in Germany
- Literature study performed by Dr. Michel Haller, SPF Research, Rapperswil, about such measuring campaigns (*circulated*)
- Main conclusion: the drinking water distribution network (cold and hot water) is the main source of contamination by Legionella, not the store!

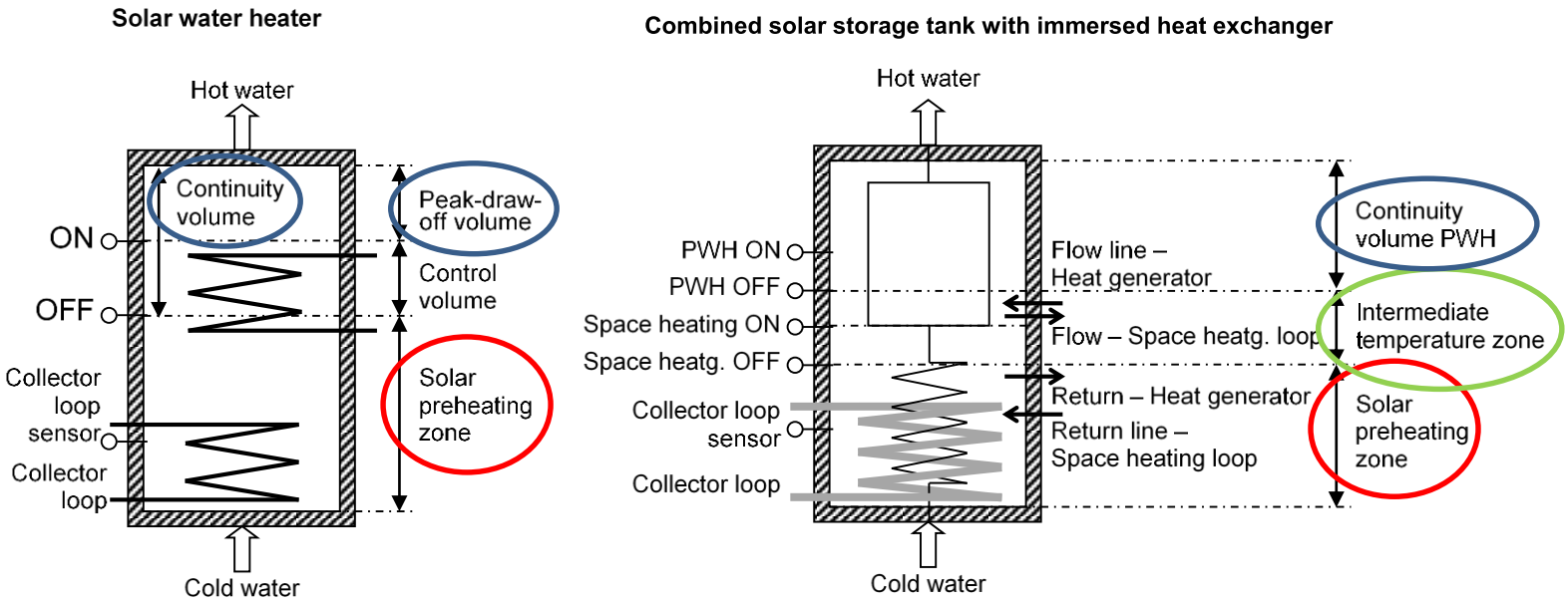
Facts and figures on drinking water hygiene in buildings

- Prof. Th. Kistemann, Universitätsklinikum Bonn
  - about 25% of 73 multi-family buildings have a (very light to severe) contamination
  - Large installations more frequently contaminated than small ones
  - Circulation line installed → higher risk of contamination
  - Distribution lines more frequently contaminated than stores; probably: contamination of stores by return flow of circulation lines
  - Cold water temperature measured at taps: 16 °C to 58 °C (!!)
  - Hot water temperature measured at taps: 19 °C (!!) to 72 °C
  - Maintenance is a very important parameter; documentation must be very clear; operators of the installations must be well instructed
  - Temperature at store outlet is only one of several important factors for the contamination risk by Legionella; no absolute threshold value valid for all installations, that would separate low risk/high risk of contamination; higher risk under 50 °C; lower risk above 60 °C

Some basic requirements on drinking water hygiene in buildings

- No unused drinking water distribution line nor tap (no stagnating cold or hot drinking water in the whole system)
- Only appropriate materials in contact with drinking water
- Drinking water distribution lines have to be distributed into three categories at design time:
  - Cold water lines (temperature < 25 °C)
  - (Insulated) lines maintained at a high temperature (≥ 55 °C)
  - (Uninsulated) DHW draw-off lines that cool down at ambient temperature after draw-off
- Heat traps for thermal separation of draw-off lines from the store or, if relevant, from the lines maintained at a high temperature
- Cold water lines not to be installed parallel to hot water lines or space heating distribution lines (separated shafts)
- Design rule (Switzerland): hot water has to be able to reach at least 50 °C at each tap after a certain delay (CEN/TR 16355: 60 °C after 30 s)
- Circulation lines: at least 55 °C in all branches; hydraulic equilibrium needed to be certain that temperature ≥ 55 °C everywhere; temperature measured or checked at the end of each return line
- Store outlet temperature set up according to above requirements

Hygiene rules for systems with a preheating zone (prSIA 385/1) [1]



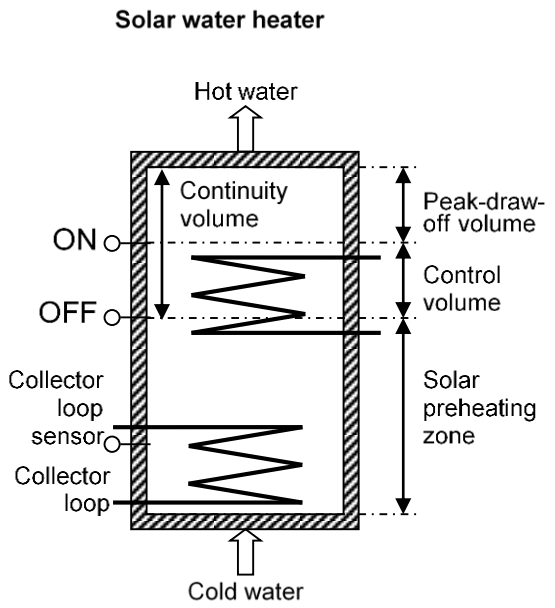
All systems with back-up-heated continuity volume (solar-only systems excluded)
Also considered: systems for heat recovery, e.g. from refrigerating machinery

PWH: official abbreviation for Potable water hot (=DHW)

Hygiene rules for systems with a preheating zone (prSIA 385/1) [2]

- Preheating and intermediate temperature zones as well as continuity volume preferably in one single storage tank; if not, then series-connected storage tanks
- Preferably industrial water in preheating and intermediate temperature zones
- Size of peak-draw-off volume:
  - Greatest 10-minutes draw-off volume, if set-up temperature 60 °C
  - Greatest 1-hour draw-off volume, if set-up temperature 55 °C
  - Background of these sizing rules: availability of a large enough volume to drastically reduce some possible population of bacteria arriving from the preheating and intermediate temperature zones

Hygiene rules for systems with a preheating zone (prSIA 385/1) [3]

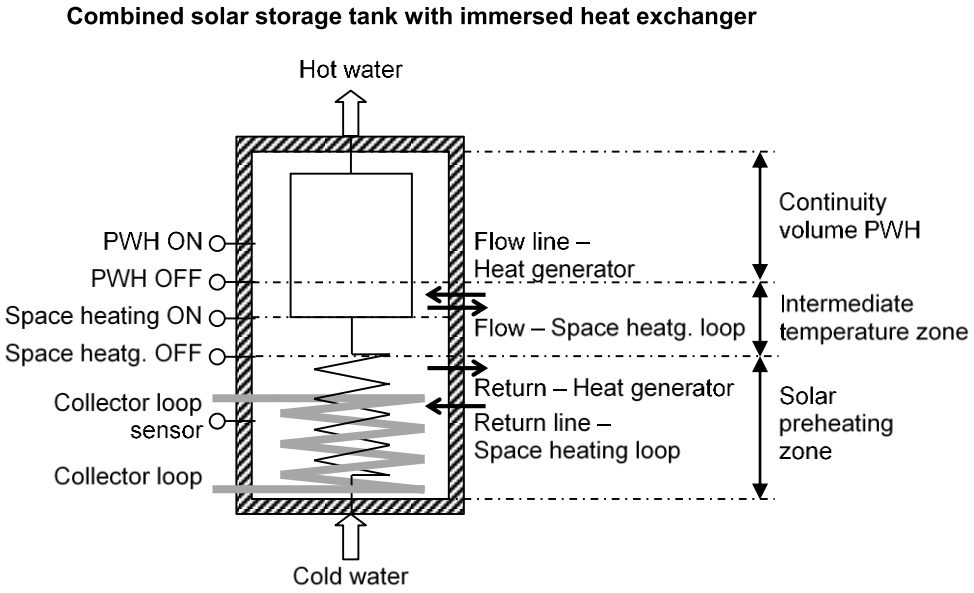


Why only every second month?
Prevent creating bacteria resistance to high temperature.
Why at least 70 °C?
Destroy biofilms in preheating zone.

<u>Water heaters containing only potable water</u>

- Preheating zone ≤ 150% of net PWH need (100% useful PWH + 50% to cover the losses)
- If (i) collector array size is such that Preheating zone temperature regularly reaches 50 °C from March to October and (ii) temperature in storage tank is allowed to reach 70 °C and higher, then PWH hygiene from normal operation is sufficient.
- Otherwise, if at least one of the 2 conditions above is not satisfied, then heat the entire preheating zone <u>up to 70 °C for one hour every second month</u>. Or apply a generally admitted preventive measure to insure PWH hygiene.

Hygiene rules for systems with a preheating zone (prSIA 385/1) [4]



Why only every second month?
Prevent creating bacteria resistance to high temperature.
Why at least 70 °C?
Destroy biofilms in preheating and intermediate temperature zones.

<u>Solar combisystems for space heating and hot water preparation</u>

- If total potable water content in preheating and intermediate temperature zones < 30% of daily PWH need, then PWH hygiene from normal operation is sufficient.
- Otherwise, if the above condition is not satisfied, heat the entire preheating zone as well as the intermediate temperature zone <u>up to 70 °C for one hour every second month</u>.

Hygiene rules for systems with a preheating zone (prSIA 385/1) [5]

- Systems without any drinking water in the storage tank:
  - PWH temperature ≥ 52 °C at the outlet of the heat exchanger if no distribution line maintained at high temperature
  - PWH temperature ≥ 55 °C at the outlet of the heat exchanger if there are distribution lines maintained at high temperature (≥ 55 °C in all of these distribution lines!)
- These rules are exactly the same if the storage tank that contains only industrial water, has no preheating zone; the temperature requirements always apply to drinking water, not to industrial water.

Conclusions

- Hygiene in drinking water systems is mainly determined by design, installation, operation and maintenance of the whole drinking water distribution network in the building.
- Optimal design requires the co-operation of the architect in order to create as much as possible a compact distribution network (short distribution lines).
- Cold water hygiene is as important as hot water hygiene.
- If solar thermal systems have large enough collector areas and if stagnation in the collector loop is correctly mastered, these systems are not critical in what regards hygiene.
- Specific measures apply to systems with a preheating zone remaining for a long time at intermediate temperatures.

Thank you for your attention!